

1A



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,287	07/03/2003	Horst Corduan	LINDE-597 PI	5770
23599	7590	01/28/2005	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C.			LEUNG, RICHARD L	
2200 CLARENDON BLVD.				
SUITE 1400			ART UNIT	
ARLINGTON, VA 22201			PAPER NUMBER	
			3744	

DATE MAILED: 01/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,287

Applicant(s)

CORDUAN ET AL.

Examiner

Richard L. Leung

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 17, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The listing of references in the specification (page 2, line 13) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.
2. The disclosure is objected to because of the following informalities: the word, "Ass" on page 17, line 10 is understood to be -- As --. Appropriate correction is required.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the heat exchanger having four component areas, each component area extending over only part of the width and over only part of the depth, as recited by claim 17 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. The claims 19 and 20 are objected to because they include reference characters which are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 19 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

Art Unit: 3744

applicant regards as the invention. Both claims 19 and 20 recite the limitation, "wherein said heat exchanger core 9 is subdivided along its by separating sheets..." It is unclear along what the heat exchanger core is subdivided, rendering the claims indefinite. In other words, the claims appear to be incomplete sentences. Since the claims are too ambiguous in scope, no prior art could reasonably be applied to the claim. However, this is not to be a presumed indication of allowable subject matter.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5, 9, 10, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5979182 (Goto et al.).

Regarding claim 1, Goto et al. disclose a plate heat exchanger capable for indirect heat exchange between at least one heat transfer medium/cooling medium and a plurality of fluid flows comprising a heat exchanger core HE having a plurality of heat exchange passages for flow of at least one heat transfer medium/cooling medium, a flow of a first fluid, and flow of a second fluid (see Figs. 2-5), said heat exchanger core having a first component area and a second component area, said first component area capable of containing heat exchange passage for the first fluid flow, a said second component area capable of containing heat exchange passages for the second fluid flow, wherein said first and said second component areas are not in fluid

Art Unit: 3744

communication, and said first and second component areas each extend over the height of the heat exchanger core and said passages of said first and second component areas are rectilinear over the height of said heat exchanger core, the height of the heat exchanger core being its extension in the direction of the main flow through the heat exchange passages, and each of said first and second component areas extends over only part of the width of the heat exchanger core. Particular attention is drawn to Fig. 5 illustrating the heat exchanger core divided into the separate component areas (each labeled as HE), each component area extending rectilinearly over the height of the heat exchanger and over only part of the width of the heat exchanger core. See also column 8, lines 3-12 in which Goto et al. expressly disclose that the heat exchange unit is longitudinally divided into two sections.

Regarding claim 2, the heat exchanger core comprises a plurality of separating plates (i.e. heat exchange walls) arranged parallel to one another, wherein the heat exchange passages for each of the fluids are defined in the spaces between said plates, as is conventional in any plate heat exchanger. See particularly Fig. 3, which clearly illustrates the parallel plates, and column 2, line 61 to column 3, line 2 of the written description. It is also understood that the first and second component areas each extend over the depth of the heat exchanger core, the depth being in the direction perpendicular to the plane of said separating plates.

Regarding claims 3-5, it can be further understood that the heat exchanger contains passages capable for the flow of heat transfer medium/cooling medium that extend over the entire width of the heat exchanger core. See particularly Fig. 2.

Art Unit: 3744

Regarding claim 9, the heat exchanger further comprises a single distributor and a single collector each communicating with the first component area. See Fig. 5. It is understood that said distributor and collector traverse the depth of the heat exchanger core.

Regarding claim 10, Goto et al. disclose that the heat exchanger is used in a process for cryogenic air-separation comprising separating air into an oxygen product stream and a nitrogen product stream in an air rectification system, the heat exchanger used for cooling feed air. See columns 1 and 2.

Regarding claim 18, the heat exchanger may have additional component areas, each being connected to a distribution zone having inclined plates and a collection zone having inclined plates, each of said additional component areas extending over the entire width of the heat exchanger core, and each of said additional component areas having vertically running heat exchange passages for the flow of fluids. See Figs. 8A and 8B, for example.

9. Claims 11-16 are rejected under 35 U.S.C. 102(b) as being anticipated by the admitted prior art, as disclosed by figures 1-4 and the present specification. The admitted prior art discloses a process for indirect heat exchange of several fluid flows 30, 40, and 50 with a heat transfer medium/cooling medium 10 and 20 in a heat exchanger core 9 comprising routing the heat transfer medium/cooling medium 10 and 20, a first fluid flow 40 and a second fluid flow 30 through a plurality of heat exchange passages. Said first fluid flow 40 is routed through a first component area 48 of the heat exchanger core 9 and said second fluid flow 30 is routed through a second component

Art Unit: 3744

area 38 of the heat exchanger core 9, said first and second component areas 48 and 38 are not in fluid communication and each extends over the entire height of the heat exchanger core 9, as broadly recited by claim 11, and it disclosed that said first and second fluid flows 40 and 30 are obtained by cryogenic separation of feed air, as required by claim 15, and are brought into indirect heat exchange with air, as required by claim 16. Claim 12 requires that said first and second fluid flows 40 and 30 each have a pressure of less than 3.5 bar, and claim 13 requires that pressure be between 1.1-1.8 bar. It is disclosed in the discussion of the admitted prior art, on page 11, lines 18-20, said fluid flows 40 and 30 have a pressure of roughly 1.3 bar. Claim 14 requires another fluid flow having a pressure of more than 4 bar be routed through the heat exchanger core 9. As disclosed in prior art Figs. 1 and 4, an additional fluid flow 60 is routed through said heat exchanger core 9, and said fluid flow 60 is disclosed as having a pressure of more than 5 bar on page 13, lines 20-21.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1, 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of US 5979182 (Goto et al.).

Regarding claims 1 and 6, the admitted prior art discloses a plate heat exchanger 1 for indirect heat exchange between at least one heat transfer medium/cooling medium

Art Unit: 3744

10 and 20, and a plurality of fluid flows 30, 40, and 50. Said plate heat exchanger 1 comprises a heat exchanger core 9, having a plurality of heat exchange passages for flow of at least one heat transfer/cooling medium 10 and 20, flow of a first fluid 40, and flow of a second fluid 30. Said heat exchanger core 9 having a first component area 48 containing heat exchange passages for the first fluid flow and a second component area 38 containing heat exchange passages for the second fluid flow. Said first and second component areas 48 and 38 are not in fluid communication and each extends over the height of the heat exchanger core 9 (see Figs. 3 and 4). Said plate heat exchanger 1 is also disclosed as having a third component area 58 which is not in fluid communication with said first and second component areas 48 and 38 and which extends over the entire height of said heat exchanger core 9 (see Fig. 2), said third component area 58 containing heat exchange passages for flow of a third fluid 50. The admitted prior art fails to disclose that the first, second, and third passages are rectilinear over the height of said heat exchanger core, and that said first, second, and third areas extend only part of the width of the heat exchanger. As already described above, Goto et al. teach a related plate heat exchanger that comprises component areas that extend only part of the width of the heat exchanger core and having fluid passages in the component areas that are rectilinear over the height of the heat exchanger. See particularly Fig. 5 and column 8, lines 3-6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the heat exchanger of the admitted prior art to have the passages extend only part of the width of the heat exchanger, as demonstrated by Goto et al., because this would create a simpler design, and it would

Art Unit: 3744

have been further obvious to have the passages be rectilinear, as also demonstrated by Goto et al., in order to reduce the pressure loss of the fluid flowing through said passages.

Regarding claim 7, although it is disclosed that said heat exchanger 1 of the admitted prior art is a plate heat exchanger, it is not clearly disclosed that said plate heat exchanger 1 actually has a plurality of separating plates arranged parallel to one another wherein the spaces between said plates contain said heat exchange passages, and the discussion of the admitted prior art fails to disclose that said component areas 48 and 38 each extend over the depth of the heat exchanger core 9. As already discussed above, the heat exchanger core taught by Goto et al. comprises a plurality of separating plates (i.e. heat exchange walls) arranged parallel to one another, wherein the heat exchange passages for each of the fluids are defined in the spaces between said plates, as is conventional in any plate heat exchanger. See particularly Fig. 3, which clearly illustrates the parallel plates, and column 2, line 61 to column 3, line 2 of the written description. It is also understood that the first and second component areas each extend over the depth of the heat exchanger core, the depth being in the direction perpendicular to the plane of said separating plates. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the plurality of separating plates in the heat exchanger disclosed in the admitted prior art, and to have the component areas and associated distributors/collectors extend over the depth of the heat exchanger because Goto et al. teach that this arrangement can be used to efficiently effect heat exchange among the fluids of involved in air separation.

Art Unit: 3744

Regarding claim 8, it is already disclosed by the admitted prior art that it is conventional for said flows of heat transfer/cooling medium 10 and 20 to be distributed over the entire width of said heat exchanger core 9 (page 13, lines 12-14).

Allowable Subject Matter

12. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

13. Since no arguments have been filed with respect to the objection to the specification, the disclosure remains objected to.

14. Applicant's arguments, filed 05 November 2004, with respect to the objection to claim 1 have been fully considered and are persuasive in view of the amendment. The objection of claim 1 has been withdrawn.

15. Applicant's arguments, filed 05 November 2004, with respect to the rejection of claim 5 under 35 U.S.C 112, second paragraph have been fully considered and are persuasive in view of the amendment. The rejection of claim 5 under 35 U.S.C. 112, second paragraph has been withdrawn.

16. Applicant's arguments, filed 05 November 2004, with respect to the rejections of claims 11-16 under 35 U.S.C. 102(b) have been fully considered, but they are not persuasive. In response to applicant's argument that the references fail to show certain features of applicant's invention (see page 8 of Remarks), it is noted that the features upon which applicant relies (i.e., rectilinear passages, having component areas which

Art Unit: 3744

extend over only part of the width) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

17. Applicant's arguments with respect to claims 1-10 and 18-20 have been considered but are not persuasive in view of the new ground(s) of rejection.

Conclusion

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6629433 B2 (Corduan et al.): discloses a process and apparatus for heat exchange comprising rectilinear heat exchange passages.

Art Unit: 3744

US 6516874 B2 (Mathur et al.): discloses a plate heat exchanger.

US 6347662 B1 (Davidian et al.): discloses a plate heat exchanger for use in an air separation unit.

US 6128920 (Matsuo et al.): discloses a heat exchange apparatus including a straight passage for gas and passages for refrigerants.

US 6089313 (Levy et al.): discloses an apparatus for exchanging heat between at least three fluids.

US 5333683 (Arriulou et al.): discloses a plate heat exchanger for the indirect heat exchange between fluids comprising separating strips between regions.

US 5324452 (Allam et al.): discloses a multi-stream plate heat exchanger.

US 5031693 (VanDyke): discloses a plate-type heat exchanger.

US 4721164 (Woodward): discloses a heat exchanger with several passages for different fluids.

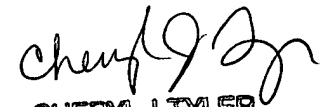
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 571-272-4811. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise L. Esquivel can be reached on 571-272-4808. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 3744

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
Art Unit 3744


CHERYL J. TYLER
PRIMARY EXAMINER

rl